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ABSTRACT

The purpose of this study was to investigate the effects of various translation methods used in imported instructional video programs on Taiwan elementary school students' visual and verbal memory. Following pretesting, 128 fourth grade students from an urban public elementary school in northern Taiwan participated. The students in 4 experimental and 1 control group, watched a 20-minute video program on the reproduction and birth behaviors of animals which was translated in one of the following ways: (1) Chinese narration, with no subtitles; (2) English narration, with complete Chinese subtitles; (3) Chinese narration, with complete Chinese subtitles; (4) Chinese narration, with key-words subtitled in Chinese; and (5) English narration, with no subtitles. The students were immediately given a posttest, and retested two weeks later. The 51-item test measured their visual and verbal memory through a color photo recall and an achievement-like exam. Experimental groups significantly outperformed the control group on the visual memory subtests, in both immediate and delayed posttests. In terms of verbal memory, the Chinese-narration-no-subtitle group significantly outperformed the Chinese-narration-key-words-subtitle group and the control group in the immediate posttest; in the delayed posttest, there was no significant difference among the five groups. In total score, Chinese-narration-no-subtitle group significantly outperformed the control groups, both in immediate and delayed posttesting. Based on these results, it is suggested that Chinese narration be added to imported instructional video programs in order to facilitate young students' memory, and parents, teachers, and distributors keep this in mind when purchasing such videos. (MAS)

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EFFECTS OF TRANSLATION METHODS IN IMPORTED INSTRUCTIONAL
VIDEO PROGRAMS ON TAIWAN FOURTH GRADERS' MEMORY

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ABSTRACT

The purpose of this study was to investigate the effects of various translation methods employed in imported instructional video programs on Taiwan elementary school students' visual and verbal memory.

In the spring of 1993, 128 fourth graders from an urban public elementary school in northern Taiwan participated in this study. The experimental design of this study was a pretest-posttest control-group design.

R O1 X1 O6 O11
R O2 X2 O7 O12
R O3 X3 O8 O13
R O4 X4 O9 O14
R O5 C O10 O15

Note:

R: Random assignment

O1 to O5: Pretest on subjects' prior knowledge of the contents

X1: Chinese narration, no subtitle

X2: English narration, complete Chinese subtitle

X3: Chinese narration, complete Chinese subtitle

X4: Chinese narration, key-words subtitled in Chinese

C : English narration, no subtitle

O6 to O10: Immediate posttest

O11 to O15: Delayed posttest (held two weeks later)

Students watched a video program of about 20 minutes in length on the reproduction and the birth behaviors of animals. As noted above, in the two "complete subtitle" groups, subjects viewed a video program with complete Chinese subtitle. In the "key-words subtitle" group, subjects viewed a video program in which fifteen key words in Chinese were presented when referred to by the narration. These key words were the answers to 16% of the verbal memory test items.

During the experiment, the five groups received the pretest, viewed one of the five video programs with different translation versions as described above, received the immediate posttest, and were dismissed. The whole procedure lasted about forty minutes.

Subjects were not allowed to take notes while they viewed the video program. Two weeks later, the researchers went back to these students' classroom during their Natural Science class to conduct the delayed posttest.

Subjects' visual memory and verbal memory were measured by 20 and 31 test items respectively. In the visual test items, subjects were first presented ten color photos printed from the video program they just viewed ("The Reproduction and the Birth Behaviors of Animals") and similar video programs (i.e., "The Wonders of Baby Animals" and "The Parenthood Behaviors of Animals") produced by the same company, and were asked to identify which photos were printed from the video program they just viewed. Subjects were then presented ten other color photos, which were all printed from "The Reproduction and the Birth Behaviors of Animals" video, and were asked to identify the content associated with these screens.

The verbal memory test items, including true-or-false, multiple choice, fill-in-the-blank, and make-connections, were very much like those in achievement tests.

Content-related validity of these test items was established. Reliability information about the tests were reported in Table 1.

Table 1

Split-half Reliability Coefficients and Other Important Information about the Tests

Tests	Nature of Test Items	#of Items	Reliability Coefficients
1. Pretest	Verbal memory test items	31	.7755
2. Immediate	Visual & Verbal memory test items	51	.8456
Posttest	• Visual memory test items	20	.7899
	• Verbal memory test items	31	.7755
3. Delayed	Delayed posttest and immediate		
Posttest	Posttest were identical.		

One-way Analysis of Covariance (ANCOVA) was performed on posttest scores using the pretest score as the covariate. Analysis results were summarized into the following findings:

1. Experimental groups significantly outperformed the control group on VISUAL MEMORY subtest, in both the immediate and delayed posttests.
2. In terms of VERBAL MEMORY, the Chinese-narration-no-subtitle group significantly outperformed the Chinese-narration-key-words-subtitle group and the control group in the immediate posttest. In the delayed posttest, there was no significant difference among the five groups.
3. In terms of the TOTAL SCORE (the sum of the visual and verbal memory scores), the Chinese-narration-no-subtitle group significantly outperformed the control group, both in the immediate and the delayed posttests.

Generally speaking, empirical data gathered in this study indicated that the Chinese-narration-no-subtitle group significantly outperformed the control group. According to the findings, the researchers suggested that Chinese narration be added to imported instructional video programs in order to facilitate youngsters' memory. Teachers, parents, and distributors might also wish to take this finding into consideration when purchasing imported instructional video programs.

EFFECTS OF TRANSLATION METHODS IN IMPORTED INSTRUCTIONAL VIDEO PROGRAMS ON TAIWAN FOURTH GRADERS' MEMORY

CHAPTER 1 INTRODUCTION

According to an audio visual education implementation survey report, elementary schools had an average of 1.777 TV sets, .699 VHS videotape recorders, and 1.021 Beta videotape recorders. More than 70% of elementary school teachers used videotapes as an instructional aid (National Institute of Educational Materials, 1990). It reveals that the videotape has been widely used in Taiwan elementary schools nowadays. Many elementary schools have already collected a lot of instructional video programs as supplementary teaching materials.

These instructional videotapes were produced either by domestic production companies or were imported from foreign countries. In order to get more buyers, dealers usually go through some translation procedures before selling. The translation methods usually are: adding Chinese narration, adding Chinese subtitles, or adding both Chinese narration and subtitles.

Researchers have asked some import companies about how they decided the translation methods. It was found that budget is the main consideration for most companies. "Just do what the boss asked for." or "Do it the simplest way." are the rest of the answers.

It seems that no translation method is selected based on the characteristics of viewers' attention, learning, and memory. However, videotapes have been one of the standard instructional media in Taiwan elementary schools. And there are more than 360,000 elementary students in each grade every year. They will possibly be exposed to those imported videotapes. Many of the 128 children in this study felt their videotape viewing experiences were not satisfying because the time the subtitles appeared on the screen was too short for comfortable reading. Furthermore, it was also hard for children to comprehend the program's content under an unfamiliar language environment, even if the instructor stopped the tape at intervals and interpreted the content. This kind of learning limitation will decrease the effectiveness of videotapes as an instructional tool.

Unfortunately, no empirical research has been done regarding the effects of translation methods in imported instructional video programs on Taiwan for elementary school students. Researchers found studies by Hwang (1991) and Shen (1993), both were conducted in Taiwan and were partly related to subtitles and learning. However, the instructional

media, learning content, and subjects in Shen and Hwang were not exactly the same as in this study.

The many uncertain facts above aroused the researchers' interests to execute this project and try to find out whether different translation methods in imported instructional video programs will affect visual memory and verbal memory for the fourth graders in our country. Do various translation methods play a "helping" or an "interrupting" role while the children are watching the tapes? If there is a better way to present an imported instructional video program to our fourth graders, what might it be? The researchers hope the results can provide suggestions to those who buy imported videotape programs, no matter whether they are teachers, parents or distributors.

CHAPTER 2 REVIEW OF RELATED LITERATURE

In this chapter, two topics are addressed. First, a review of research studies on childrens' learning from TV is presented. Second, the influence of modality and sign types on learning is discussed.

TELEVISION, VIDEOTAPE AND LEARNING

Generally speaking, visible movements catch children's attention easily. Television's image is a media particularly well suited to present visual and moving action and transformation. Besides, movements are easier to be remembered because elementary school students recall actions from a narrated TV story better than they recall actions from the same story read to them from a picture book (Meringoff, 1980).

The subjects of this research are in Piaget's "Concrete-Operation Stage". Children mainly can only consider or measure things by solid and visible facts rather than an abstract idea. However, another characteristic of television is that it can demonstrate a spatial relationship clearly. This factor can help kids even when they cannot yet construct from pure verbal information. It reinforces the value of television for modeling visual/spatial skills at an early stage of learning (Greenfield, 1984).

Television has been a familiar and necessary product in our daily life for a long time.

Even children, in Taiwan, spend an average of two hours watching television everyday (Wu, 1992). There have been abundant studies concerning children learning from TV since the 1940s. Most of the papers focus on childrens' comprehension of (and attention to) televised role playing, TV show content, TV advertising and TV violence (Huston and Wright, 1983; Wober, 1988; Condry, 1989; Wu, 1992). Also, many papers have discussed the effect of videotape production techniques, such as the way to present subtitles, on learning. However, whereas their subjects were hearing-impaired (Boyd and Vader, 1972; Koskinen, 1983; Willson and Koskinen, 1986;) and foreign students (Parry and Meredith, 1984; Markham, 1989;), subjects in this study were local elementary school students.

In Taiwan, Hwang (1991) conducted an experiment which studied the effect of television captions on adult learning. She found that keyword-caption group's achievement scores were significantly higher than those of full-script-captions group; and that the full-script-caption group's achievement scores were significantly higher than those of no-caption group. Shen (1993) employed a computer-based interactive videodisc system to investigate the effects of captioning used to provide knowledge of results feedback on Taiwan college students' English listening comprehension. It was concluded that the captioning group performed better than the "no captioning" group.

Gallagher (1987) considered the potential of the videotape and stated that "one of the pedagogical tasks of the next decade may well be discovering the most efficacious ways of employing this omnipresent piece of technology". Videotape has almost all of the advantages of television except the duration of validity (Hu, 1993). Furthermore, easy execution, schedule flexibility, the ability to replay multiple times, and storage and carrying convenience are other characteristics of videotape. In delivering exactly the same video program, the broadcasting delivery fee is 101 times higher than the postage costs in Taiwan (Chen and Hu, 1993). It reveals that videotape has the value to play an instructional supplementary role in the future.

THE INFLUENCE OF MODALITY AND SIGN TYPES LEARNING

The content of recording media is conveyed by two types of signs: iconic sign and digital sign. Viewers perceive iconic sign, such as an image or action, by means of visual modality. But for the channel to receive digital sign, viewers could accept it either from auditory modality (i.e., narration) or from visual modality, (i.e., subtitles or captions) or from both modalities.

As Fleming and Levie (1984) advised:

For verbal materials in a single channel situation,
the more difficult or complex the verbal material,
the greater the perceptual advantage of the visual
channel (printed) over the auditory (spoken). (p.59)

There is a qualitative difference when TV viewers perceive information from visual and auditory channels. They have a chance to watch repeatedly and selectively when the visual information is still on. Whereas, they have no second chance for auditory information, except to stop and replay the program. It is very important for the message designer to remember this difference. Severin (1967) also considered the influence of modality and sign types learning as following:

1. Multi-channel communications which combine words with related or relevant illustrations will provide the greatest gain because of the summation of cues between channels. For example, having a narrator read "apple" combined simultaneously with an apple picture or a diagram will cause more learning effects.
2. Multi-channel communications which only combine words in two channels (words aurally and visually in print) will not result in significantly greater gain than single-channel communications since the added channel does not provide additional cues. Pronouncing "apple", for instance, and seeing the word's spelling "apple" at the same time will not improve test results.
3. Multi-channel communications which contain unrelated cues in two channels will cause interference between channels and result in less information gain than if one channel were presented alone. For example, listening to either "apple" or "orange" while seeing the spelling of the other will confuse the receiver as he/she learns.

Reese (1983) found audience learning from TV news was improved through between-channel redundancy, he believed that multi-channel redundancy cannot be thought of as additive effect of individual channels. He found that a three-way combination of redundant print, aural and pictorial information is no better than an original two-way audio-visual arrangement, and is significantly worse in one of the stories he tested. The main reason is that the captions apparently drew attention away from the pictorial channel. Reese's finding supports Broadbent's conclusion (1958) which argued that learning decreased when viewers tried to process an additional source of information through print information, while also processing redundant information through audio and pictorial information.

For limited-English-proficient elementary school students, using a rich context with visual, graphic and oral/aural cues, through a Closed-Captioned TV (CCTV) program can encourage them to learn. Teachers also were enthusiastic about the televised lessons and would like to continue using CCTV instruction. A majority of the students enjoyed trying to read the captions, although many of them felt that reading was more difficult than simply watching and listening. Most of the students thought they learned "faster" with CCTV (Center for applied linguistics, 1989).

CHAPTER 3 METHODOLOGY

EXPERIMENTAL DESIGN AND PROCEDURE

The experiment's design of this study was a pretest/posttest control group format.

R O1 X1 O6 O11

R O2 X2 O7 O12

R O3 X3 O8 O13

R O4 X4 O9 O14

R O5 C O10 O15

Note:

R: Random assignment

O1 to O5: Pretest on subjects' prior knowledge of the contents

X1: Chinese narration, no subtitle (C/NS)

X2: English narration, complete Chinese subtitle (E/CS)

X3: Chinese narration, complete Chinese subtitle (C/CS)

X4: Chinese narration, key-words subtitled in Chinese (C/KS)

C : English narration, no subtitle (E/NS)

O6 to O10: Immediate posttest

O11 to O15: Delayed posttest (held two weeks after the experiment)

In this experiment, subjects received the pretest, viewed an instructional video program of different translation versions, received an immediate posttest, and received a delayed posttest two weeks after the experiment. The instructional video program used in this experiment was on the reproduction and birth behaviors of animals. The video lasted

for twenty minutes.

SUBJECTS

Subjects were 128 fourth-graders enrolled in an urban public elementary school in northern Taiwan during the spring of 1993. Among them, 63 were boys and 65 were girls. They were randomly assigned to the four experimental groups and the control group. Descriptive statistics of subjects' important characteristics are reported in Table 1.

Table 1

Group Means and Standard Deviations of Last Semester's Chinese Language and Nature Science Scores, Reven Coloured Progressive Matrices (CPM) Score and Pretest Score

Group	n	Chinese Language Score		Nature Science Score		CPM Score		Pretest Score	
		M	SD	M	SD	M	SD	M	SD
C/NS	25	92.28	4.03	89.44	5.59	44.70	7.19	9.08	3.40
E/CS	26	92.65	2.83	90.27	3.39	45.15	7.07	12.00	3.92
C/CS	26	89.65	5.70	86.81	6.05	42.62	7.70	9.77	3.06
C/KS	23	91.09	2.61	88.78	4.34	46.13	5.01	11.43	2.61
E/NS	28	90.46	4.22	86.86	7.04	44.41	6.90	6.36	3.00

Analysis of Variance (ANOVA) indicated that there was no significant difference among these five groups' mean Chinese Language scores, Nature Science scores and Reven IQ scores; $F(4,127)=2.3705$, $p=.0561$; $F(4,127)=2.0962$, $p=.0853$; $F(4,124)=.8757$, $p=.4807$. However, subjects' pretest scores differed significantly among groups, $F(4,127)=12.6226$, $p=.0000$. It was also found that the pretest score was significantly correlated with the posttest scores. Thus, the pretest score was treated as the covariate in the analyses of posttest scores.

MATERIALS AND INSTRUMENTS

The materials used in this experiment were an instructional video program translated into five versions. The video program was about twenty minutes long. It was on the reproduction and the birth behaviors of the animals. The five translation versions were:

1. Chinese narration, no subtitle (C/NS)
2. English narration, complete Chinese subtitle (E/CS)
3. Chinese narration, complete Chinese subtitle (C/CS)
4. Chinese narration, key-words subtitled in Chinese (C/KS)
5. English narration, no subtitle (E/NS)

The instruments used in this experiment included the pretest, the immediate posttest and the delayed posttest. The immediate posttest and the delayed posttest were identical.

The researchers and two subject teachers worked together to develop these tests. Test items were generated evenly from the forty seven paragraphs of the script to ensure the criterion-referenced validity.

Forty five fourth graders enrolled in the same elementary school attended the pilot test. Their data were used to establish split-half reliability for these tests. Detailed information about this tests are reported in Table 2.

Table 2.

Split-half Reliability Coefficients and Other Important Information about the Tests

Tests	Nature of Test Items	#of Items	Split-half Reliability Coefficients
1. Pretest	Verbal memory test items	31	.7755
2. Immediate	Visual & Verbal memory test items	51	.8456
Posttest	• Visual memory test items	20	.7899
	• Verbal memory test items	31	.7755
3. Delayed	Delayed posttest and immediate		
Posttest	Posttest were identical.		

CHAPTER 4 RESULTS

Hypothesis 1:

There will be significant differences among the treatment and the control groups on their visual memory scores of the immediate posttest.

Finding on Hypothesis 1:

One-way Analysis of Covariance (ANCOVA) was performed on subjects' visual memory scores of the immediate posttest, with subjects' pretest scores as the covariate. Analysis result indicated there was a significant difference among groups on their visual memory scores of the immediate posttest. $F(4,122)=13.789$, $p=.000$. Post hoc analysis indicated C/NS, E/CS, C/CS and C/KS significantly outperformed the control group (E/NS), $p=.01$.

Hypothesis 2:

There will be significant differences among the treatment and the control groups on their verbal memory scores of the immediate posttest.

Finding on Hypothesis 2:

One-way Analysis of Covariance (ANCOVA) was performed on subjects' verbal memory scores of the immediate posttest, with subjects' pretest scores as the covariate. Analysis result indicated there was a significant difference among groups on their verbal memory scores of the immediate posttest. $F(4,122)=7.489$, $p=.000$. Post hoc analysis indicated C/NS significantly outperformed C/KS and the control group (E/NS), $p=.01$.

Hypothesis 3:

There will be significant differences among the treatment and the control groups on their total scores of the immediate posttest.

Finding on Hypothesis 3:

One-way Analysis of Covariance (ANCOVA) was performed on subjects' total scores of the immediate posttest, with subjects' pretest scores as the covariate. Analysis result indicated there was a significant difference among groups on their total scores of the immediate posttest. $F(4,122)=12.654$, $p=.000$. Post hoc analysis indicated C/NS, E/CS, C/CS and C/KS significantly outperformed the control group (E/NS); C/NS also significantly outperformed C/KS; $p=.01$.

Hypothesis 4:

There will be significant differences among the treatment and the control groups on their visual memory scores of the delayed posttest.

Finding on Hypothesis 4:

One-way Analysis of Covariance (ANCOVA) was performed on subjects' visual memory scores of the delayed posttest, with subjects' pretest scores as the covariate. Analysis result indicated there was a significant difference among groups on their visual memory scores of the delayed posttest. $F(4,121)=7.460$, $p=.000$. Post hoc analysis indicated C/NS, E/CS, C/CS and C/KS significantly outperformed the control group (E/NS), $p=.01$.

Hypothesis 5:

There will be significant differences among the treatment and the control groups on their verbal memory scores of the delayed posttest.

Finding on Hypothesis 5:

One-way Analysis of Covariance (ANCOVA) was performed on subjects' verbal memory scores of the delayed posttest, with subjects' pretest scores as the covariate. Analysis result indicated there was no significant difference among groups on their verbal memory scores of the delayed posttest. $F(4,121)=2.325$, $p=.060$.

Hypothesis 6:

There will be significant differences among the treatment and the control groups on their total scores of the delayed posttest.

Finding on Hypothesis 6:

One-way Analysis of Covariance (ANCOVA) was performed on subjects' total scores of the delayed posttest, with subjects' pretest scores as the covariate. Analysis result indicated there was a significant difference among groups on their total scores of the delayed posttest. $F(4,121)=5.057$, $p=.001$. Post hoc analysis indicated C/NS significantly outperformed the control group (E/NS), $p=.01$.

Results of the previous analyses are summarized in Table 3.

Table 3

Summary of the Analysis Results

Test (Subtests)	ANCOVA Result	Post hoc ($p=.01$)
<i>1. Immediate Posttest</i>		
Visual memory score	sig. diff. $p=.000$	C/NS > E/NS E/CS > E/NS C/CS > E/NS C/KS > E/NS
Verbal memory score	sig. diff. $p=.000$	C/NS > E/NS C/NS > E/NS
Total score	sig. diff. $p=.000$	C/NS > E/NS E/CS > E/NS C/CS > E/NS C/NS > C/KS
<i>2. Delayed Posttest</i>		
Visual memory score	sig. diff. $p=.000$	C/NS > E/NS E/CS > E/NS C/CS > E/NS C/KS > E/NS
Verbal memory score	no sig. diff. $p=.060$	
Total score	sig. diff. $p=.001$	C/NS > E/NS

Note: C/NS: Chinese narration, no subtitle

E/CS: English narration, complete Chinese subtitle

C/CS: Chinese narration, complete Chinese subtitle

C/KS: Chinese narration, key-words subtitled in Chinese

E/NS: English narration, no subtitle (the control group)

CHAPTER 5 SUMMARY, DISCUSSION AND RECOMMENDATIONS

SUMMARY AND DISCUSSION

The purpose of this study was to investigate the effects of translation methods employed in imported instructional video programs on Taiwan elementary school students'

visual memory and verbal memory. In the spring of 1993, the researchers randomly assigned 128 fourth graders into four experiment groups and one control group. Subjects received the pretest, viewed an instructional video program of different translation versions, and received an immediate posttest. Subjects then received a delayed posttest two weeks after the experiment.

The five groups viewed the instructional video program with the following translation methods:

Exp. group #1: Chinese narration, no subtitle (C/NS)

Exp. group #2: English narration, complete Chinese subtitle (E/CS)

Exp. group #3: Chinese narration, complete Chinese subtitle (C/CS)

Exp. group #4: Chinese narration, key-words subtitled in Chinese (E/KS)

Control group: English narration, no subtitle (E/NS)

One-way Analysis of Covariance was performed on posttests scores using pretest score as the covariate. Analysis results could be summarized into the following findings.

1. Experiment groups significantly outperformed the control group on visual memory subtest, no matter in immediate or delayed posttests.
2. In terms of the verbal memory, Chinese-narration-no-subtitle group significantly outperformed Chinese-narration-key-words-subtitle group and the control group in the immediate posttest. In the delayed posttest, there was no significant difference among five groups.

This finding differs from Hwang's finding (1993). Hwang studied the effects of television captions on adult learning in the National Open University in Taiwan and found that the key-word-caption group (which corresponds to the Chinese-narration-key-words-subtitle group in this experiment) significantly outperformed the no-caption group (which corresponds to the Chinese-narration-no-subtitle group in this study) on the posttest (which is similar to the verbal memory subtest in this piece of research). The researchers believe possible explanations lie in the difference between subjects, key-word selection criteria as well as the degree of correlation between key-words and posttest in these two experiments.

This finding does support Reese's finding (1983) and Broadbent's attention theory (1958). Reese studied the effects of between-channel redundancy on television news learning and found that three-way combination of redundant print, aural and visual information is no better than two-way audio-visual arrangement, and is significantly worse in some cases. Broadbent's attention theory suggests attention splitting as a factor in information

loss.

3. In terms of the total score (sum of visual memory score and verbal memory score), Chinese-narration-no-subtitle group significantly outperformed the control group, both in the immediate and delayed posttests.

RECOMMENDATIONS

Empirical data gathered in this study indicates that the Chinese-narration-no-subtitle group significantly outperformed the control group on visual and verbal memory. Thus the researchers suggest that distributors should add Chinese narration to the imported instructional video program in order to enhance learning. Teachers and parents should also take this into consideration when purchasing imported instructional video programs.

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